PATENT SPECIFICATION 913,125

DRAWINGS ATTACHED.

Inventor :—ROBIN GRAY.

Date of filing Complete Specification : June 26, 1961.

Application Date : July 12, 1960. No. 24236/60.

Complete Specification Published : Dec. 19, 1962.

Index at Acceptance :—**Class 53,** BD8(D:E:F).

International Classification :—H01m.

COMPLETE SPECIFICATION.

Improvements relating to Lead-Acid Electric Accumulators.

We, CHLORIDE BATTERIES LIMITED, a British Company, of Exide Works, Clifton Junction, Swinton, Lancashire, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to lead-acid electric accumulators and is concerned with the provision of means which allow the level of the electrolyte in the cells to be kept under observation over an increased range of levels than is at present possible so that a longer interval can transpire before the cells require to be topped up.

In certain types of battery, such as those used for vehicle propulsions a guard device is usually provided below the filling orifice and vent plug to protect the top edges of the separators where they project above the plates from any instrument or device inserted through the filling orifice for topping up or for testing the electrolyte density or temperature. Such guard device can serve also as a spray arrester to deflect or break-up gas bubbles from the area beneath the vent plug. Such known devices enable observation to be made to a minimum level which is a little above the top edges of the separators which they protect and which therefore is likely to be appreciably above the top edges of the plates.

In accordance with the present invention, a guard as aforesaid which may be made of polystyrene or other suitable material, comprises a floor which has a plurality of strips adapted to rest on the top edges of the separators and strips which come between the before mentioned strips and when the device is incorporated in an accumulator lie at a lower level than the tops of the separators so that they are at approximately the level of the tops of the plates, or at such intermediate height below the first-mentioned strips as may be preferred.

There may be side walls extending downwards from the upper strips of the guard to the lower strips, but advantageously the separators themselves may serve as the side walls in respect of the gaps between the upper and lower strips. Where there are side walls, the space between the lower strips and the side walls may have means to permit circulation of electrolyte between the liquid below and the liquid above the lower strips. The guard has upwardly projecting parts to engage with other parts of the cell so as to restrict movement of the guard and locate it in position below the filling orifice and vent plug.

It will be appreciated that with our improved guard the level at which the electrolyte is standing can be observed and samples of electrolyte can be withdrawn from between the separators down to a level but little above the tops of the plates, whilst the top edges of the separators are protected against damage from above, and gas bubbles rising through the guard are deflected as desired.

The lower strips of the guard as described, when made with side walls form trough-shaped wells extending downwards below the top edges of the separators. Wells of other shapes such as for instance circular or oval might alternatively be provided which extend below the top edges of the separators.

Our improved guard may be fitted on to and between separators before the cell lid is placed in position.

Our improved separator guard indicates the lower limit of electrolyte level and we may

associate with this device an additional part to indicate the upper limit of such level, and to serve also to improve the efficiency of the device in its functions as a separator guard and as a deflector or baffle to prevent acid spray from reaching the orifice of the cell. The additional part is in the form of a perforated tubular piece forming an extension from and located on or by the underside of the orifice in the cell lid. This tubular extension is attached to the cell lid, at least temporarily, to facilitate assembly of the lid onto the cell. It carries a ledge, which may be interrupted to make it more conspicuous, which serves to indicate the upper level of the electrolyte. The tubular extension of the orifice in the cell lid serves also to prevent instruments from being inserted at such a wide angle as to cause damage to the edges of the separators constituting the sides of the troughs in the preferred form of our improved separator guard. It also prevents inserted instruments from being extended laterally beyond the projected circumference of the filling orifice, thereby allowing the use of a common separator guard of limited dimensions in a large variety of cell sizes with economy in the number of parts required to cover an extensive range of cell sizes. The tubular extension may serve also as a convenient means of preventing the separator guard from floating upwards in the electrolyte.

It will be appreciated that our improvement is of great value in cells where the plates of at least one pole are relatively thick, as, for instance, in lead-acid cells with tubular positive plates, such as are widely used for battery-driven vehicles. Such plates will accommodate between their adjacent separators a well or depression wide enough to accept the nozzles of standard hydrometer syringes. The width of the depressions in the guard is at its maximum when the two adjacent separators constitute the side walls of the depression. Where the plates are of substantial thickness, we have the advantage that specific gravity readings can be taken conveniently even when the electrolyte level has fallen well below the level of separator guards such as hitherto used. The latter provided visual observation of the electrolyte level only down to a level which was just above the top edges of the separators which they protect and resulted in the cells being topped up sooner and hence more frequently than was actually necessary.

Referring to the accompanying drawings:

Figure 1 is a plan view of a guard device according to the invention;

Figure 2 is a section on the line II—II of Figure 1;

Figure 3 is a section on the line III—III of Figure 1;

Figure 4 is a plan view of a device for indicating the upper limit of electrolyte level;

Figure 5 is a section on the line V—V of Figure 4;

Figure 6 shows devices according to the invention in position in an accumulator.

The guard device has a floor formed of strips 1 arranged to rest on the top edges of the separators 2, and strips 3 between the strips 1 and at a lower level so as to be approximately at the level of the tops of the plates 4. There are upwardly projecting parts 5 which serve to restrict movement of the device so that it is always below the filling orifice and vent plug 6.

For indicating the upper limit of electrolyte level, we may provide a part as shown in Figures 4 and 5, which is in the form of a tubular piece 7 having perforations 8, forming an extension of and located on the underside of the orifice 9 in the cell lid. The tubular piece 7 has a ledge 11 which serves to indicate the upper limit of the electrolyte level. There is a further ledge 12 which fits under the orifice 9 or where convenient ledges 11 and 12 may be common and there are tongues 13 extending upwards from the ledge 12 around the exterior of the orifice 9. This tubular part may serve also, as shown in Figure 6, to locate the guard device of Figure 1 under the filling orifice of the cell.

WHAT WE CLAIM IS:—

1. A guard device for use in electric accumulators which comprises a floor which has a plurality of strips adapted to rest on the top edges of the separators and strips which come between the before mentioned strips and when the device is incorporated in an accumulator lie at a lower level than the tops of the separators so that they are at approximately the level of the tops of the plates or at such intermediate height below the first mentioned strips as might be preferred.

2. A device as claimed in Claim 1 and having side walls extending downwards from the upper strips of the guard to the lower strips, the side walls having means for permitting circulation of electrolyte between the liquid below and the liquid above the lower strips.

3. A device as claimed in Claim 1 or 2 in which the guard has upwardly projecting parts for locating it in position or restricting its range of movement in an accumulator.

4. A guard device as claimed in Claims 1, 2 or 3, and having associated therewith an additional part for indicating the upper limit of electrolyte in a battery, comprising a tubular piece for fitting under the orifice in the cell lid and having a portion which indicates the maximum electrolyte level.

5. A device as claimed in Claim 4 in which the tubular piece has a ledge, which may be interrupted to make it more conspicuous,

adapted to lie at the position of the recommended maximum of the electrolyte level.

6. A device as claimed in Claim 4 or 5, in which the tubular piece has a ledge adapted to fit under the orifice in the cell lid, and upwardly extending tongues fitting around the exterior of the orifice.

7. A device as claimed in Claims 4, 5 or 6, in which the tubular piece serves for locating the guard device under the filling orifice of the cell.

8. A guard device for use in electric accumulators substantially as described with reference to the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

Abingdon : Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1962.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2,
from which copies may be obtained.

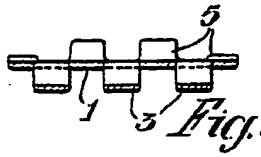

Fig.2.

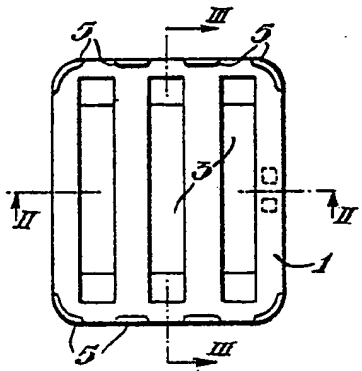

Fig.1.

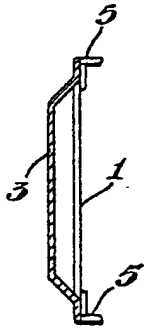

Fig.3.

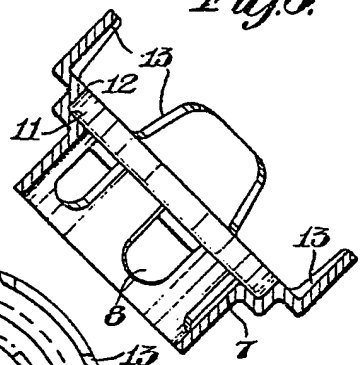

Fig.5.

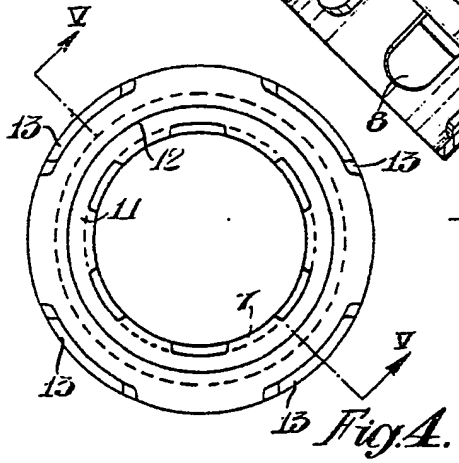

Fig.4.

913125 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 1 & 2

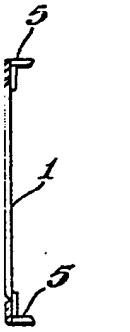

Fig.5.

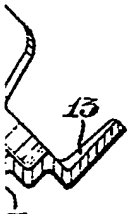

Fig.5.

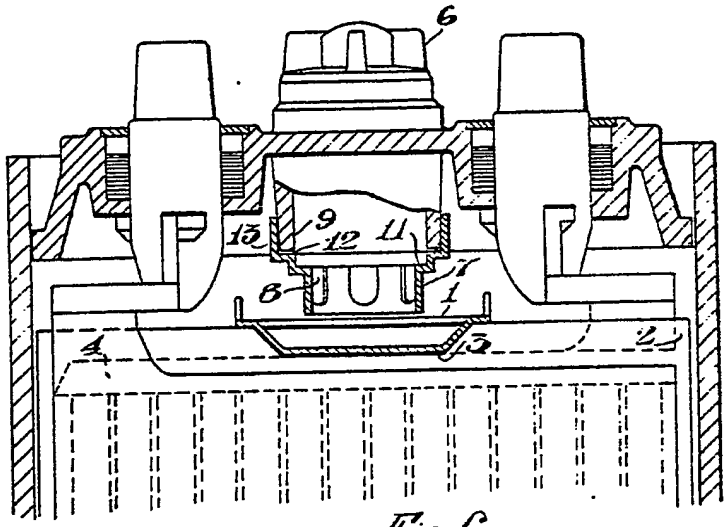

Fig.6.

913125 COMPLETE SPECIFICATION
2 SHEETS *This drowing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2

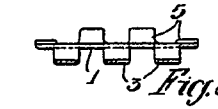

Fig.2.

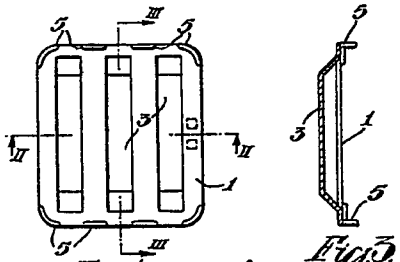

Fig.1.

Fig.3.

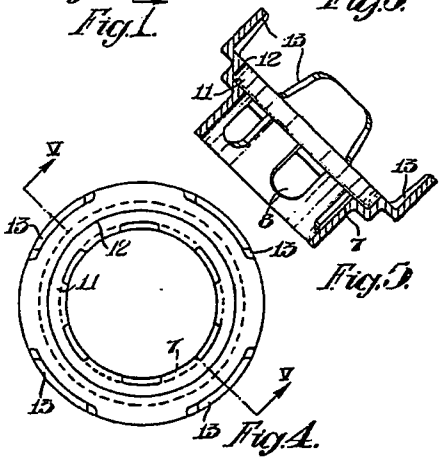

Fig.4.

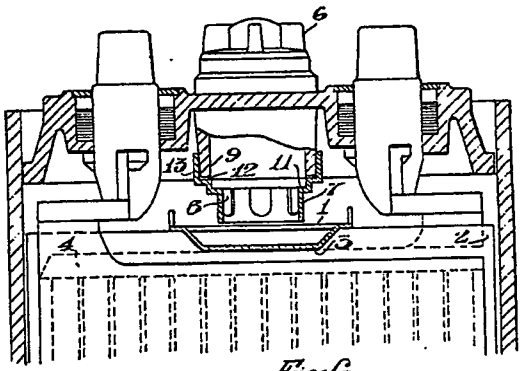

Fig.6.